Nevada Test Site

JASPER February 2003

Introduction

The Joint Actinide Shock Physics Experimental Research (JASPER) Facility is located in Area 27 of the Nevada Test Site. This facility will provide a multiple use platform to generate and measure a variety of fundamental quantities associated with thermodynamic and constitutive properties of selected actinides (radioactive chemical elements). Experiment results will be used for code refinement, permitting better predictive capability and ensuring confidence in the U.S. nuclear stockpile.

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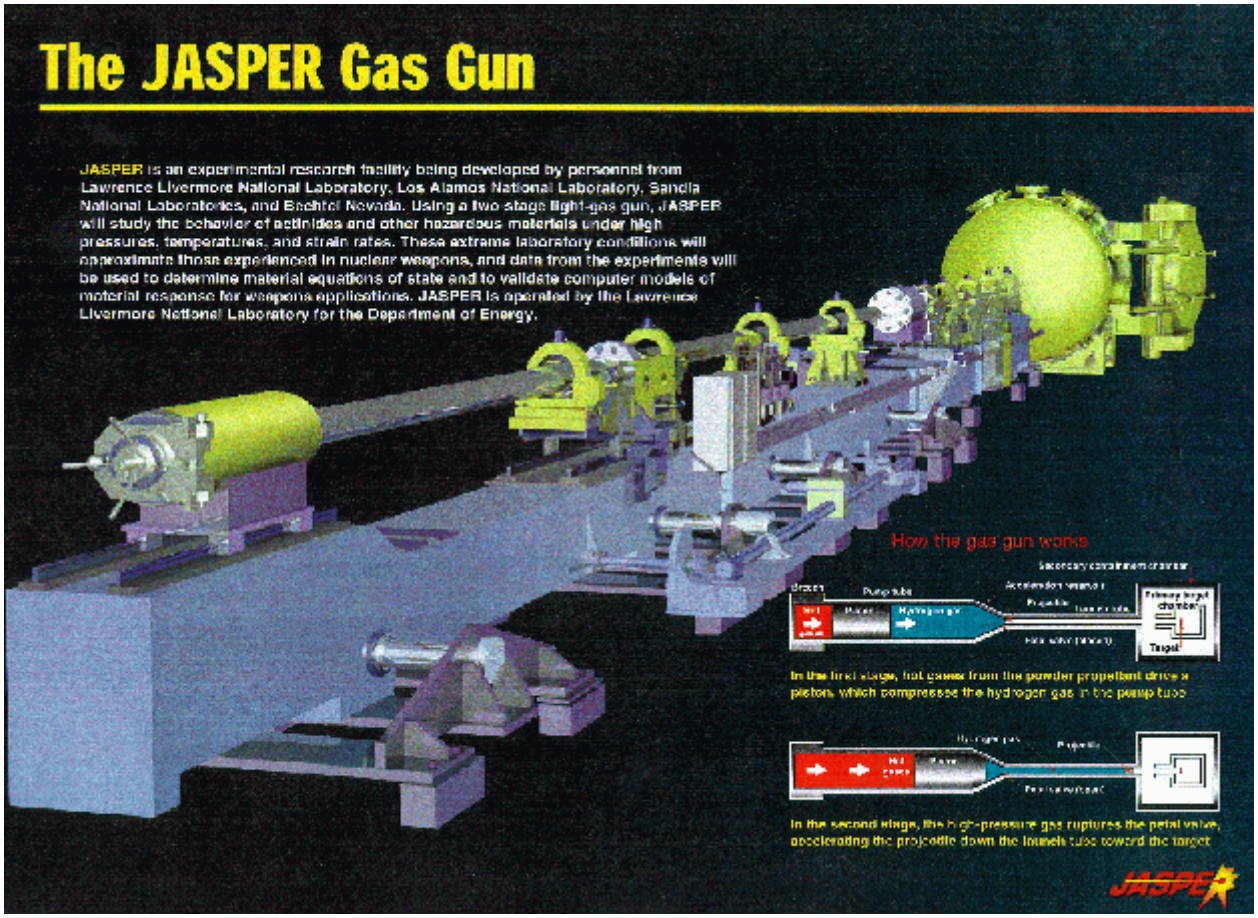

Background

On February 18, 1998, it was announced that a Two-Stage Gas Gun Facility would be located at the Nuclear Explosives Assembly Facility in Area 27 of the Nevada Test Site. This facility was no longer needed for assembly work since the new Device Assembly Facility would become operational in August 1998.

The Joint Actinide Shock Physics Experimental Research (JASPER) Facility is a multi-organizational research facility consisting of Lawrence Livermore National Laboratory (LLNL), Los Alamos National Laboratory, Sandia National Laboratories, Bechtel Nevada, and the U.S. Department of Energy. It was formed with Lawrence Livermore National Laboratory having the responsibility for overall project management, physics definition, engineering, health and safety.

Purpose

JASPER experiments will support the Stockpile Stewardship Program in several ways and are complementary to subcritical experiments that are being conducted at the Nevada Test Site. Because of the well-controlled environment of the gas gun, JASPER will provide scientists with more precise equation-of-state data than can be obtained from any other experiment.

An important experimental technique for determining the properties of materials at high pressures, temperatures, and strain rates is to shock the material by impacting a small sample with a projectile traveling at high velocity and diagnosing the material response. These tests are conducted using gas guns. Currently, the only facility available for performing these tests on special nuclear materials is the 40-millimeter, single-stage gas gun located at Los Alamos National Laboratory. This gun can achieve a maximum projectile velocity of about 2 kilometers (1.24 miles) per second.

Much higher projectile velocities are needed to fully achieve the desired shocked material conditions, thus the need for a two-stage gas gun which will be able to study plutonium and other materials at extreme conditions. The initial design of JASPER will allow projectile velocities of up to 8 kilometers (5 miles) per second, with velocities up to 15 kilometers (9.3 miles) per second envisioned with future design modifications.

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